Research Paper on Risk Analysis of BOT Scheme

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ABSTRACT

BOT (Built Operate Transfer) scheme is one of the prevailing ways for infrastructure development in India to meet the need of Indian future economic growth and development. BOT has been one of the recent innovations in project finance. The Build-Operate-Transfer scheme is limited resource financing technique. The main purpose of this study is to investigate financial risks associated with BOT Project. Major critical risks that are debt repayment risk, inflation risk and revenue risk. This paper presents a sensitivity analysis for a BOT project with a real case study. Traffic and cost are varied by 5% and O&M cost varied by 10%. Determine DSCR with different scenario.

Keywords: BOT Project, Risk, Sensitivity Analysis, DSCR- Debt Service Coverage Ratio, O&M Cost – Operating and Maintenance Cost, Revenue.

INTRODUCTION

There has been a growing trend in recent years for governments in many countries to place major public investments, particularly for infrastructure projects, into the private sector. Many have adopted the Build-Operate and Transfer or BOT approach so that the private sector has to finance, construct and operate the project facility and the transfer the ownership to the government after specified concession period. Therefore the BOT scheme is limited resource project financing technique for implementing infrastructure projects by using private funding. The development of BOT has attracted participation of local and foreign private sector investor to secure funding and to deliver project on time, within budget and to the required specification.

The financial success of a BOT project relies on the ability of project to service the debt and generate the expected equity rate of return. BOT projects in India involve many risks and problem that are due to differences in legal systems, market conditions and culture. It is crucial for investors to identify and manage the critical risks associated with investment in India’s BOT projects. Main purpose of this project is to investigate the financial risks associated with BOT projects by using risk measurement methods. The study involves combination of methods for an integrated qualitative and quantitative research method. The first stage contains comprehensive literature review with lessons learn from the practice of BOT projects in developing countries, especially in India.

The second stage contains the introduction, nature, structure of BOT project and different parties involved in BOT project. The third stage contains BOT project financing and list of different financial risks associated with BOT project. The fourth stage contains techniques of risk measurements. Then, in the case study part, the details of the project have been noted and financial risk analysis by sensitivity and scenario analysis. Last part of this study is conclusion and references.

The BOT Project

The term BOT (Built-Operate-Transfer) can be defined as major start up business venture where private organization undertake to build and operate a project, which would normally be undertaken by the government and return the ownership to the government after fixed concession period.

The term project financing refers to the financing of an economic unit in which a lender look initially to the cash flows and earning of that economic unit as the source of the funds from which a loan will be repaid and to the assets of the economic unit as collateral for the loan.
Some or even all of the following different parties could be involved in any BOT project:

1. Government
2. Project sponsor
3. Contractor
4. Lenders
5. Purchasers
6. Operator
7. Insurance
8. Supplier

**Financial Risk:**
From past study most critical risk in BOT project is financial risk. It occurs due to change in availability of funds and Change in cost of project. It is classified into following types.

a) Currency risks
b) Interest risks
c) Equity risks
d) Foreign exchange risk
e) Commercial risk
f) Liquidity risk
g) Counterparty risk
h) Economic risk

**NATURE OF RISKS IN BOT PROJECT**

The existence of risk in every single project is unquestionable. The type of risks are varied; on the nature and size of the depend project. Risk in BOT project is solitary and different but somehow always related to the phases in a project namely: initiation, implementation and operational phase. In order to accomplish the objectives, the risks need to be managed wisely. Proper measurements have to be taken into account to allow for uncertainty in the judgment which might take place during the project have to be considered. Any BOT project is subjected to influences from, within and outside organization itself. The objectives of the projects are governed by the stakeholders; possesses’ distinctive expectation and interests in the project which could jeopardize the project if the risks are not properly handled and managed. For instance, the host government always places public interest first for any project related to them. The host government would actively involve during the pre and post implementation stage by revising the design to ensure the safety of the finished product for the public.

![Diagram of Concession Company](source: Transportation Finance Summit, March 4, 2004: Optimal Risk Distribution in BOT Projects by Presenter, Miguel Abenavacas.)

**Fig. 1**
TYPES OF RISKS IN BOT PROJECT

The followings are the main findings through the literature review:

a) The BOT scheme to financing infrastructure projects has many potential advantages and is a viable alternative to the traditional approach using sovereign borrowings or budgetary resources.

b) BOT projects involve a number of elements, such as host government, the Project Company, lenders, contractors, suppliers, purchasers and so on. All of which must come together for a successful project.

b) The application of the BOT scheme in Indian infrastructure development is being carried out stage by stage.

c) There are two broad categories of risk for BOT projects: country risks and specific project risks. The former associated with the political, economic and legal environment and over which the project sponsors have little or no control. The latter to some extent could be controllable by the project sponsors.

d) A few researches of risk management associated with India’s BOT projects focused on a particular sector. Different researchers appear to have different points of view on risk identification because they have approached the topic from different angles.

Table 1

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<th>O&amp;M Cost</th>
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Based on the information given in above table-III, DSCR are calculated. A summary of the project financial indicators for the selected years is presented as follows.

Min. DSCR: - 1.06
Max. DSCR: - 4.11
Avg. DSCR: - 1.50

In addition to the Base Case, the following scenarios were projected, keeping other factors constant:

**Scenario I - Decrease in Base Traffic by 5%**

Sensitivity analysis carried out by decreasing the 5% base traffic. The sensitivity addresses the impact of lower than expected toll revenues arising due to lower than projected traffic plying on the Project State Highway.

**Scenario II - Increase in O&M Cost by 10%**

In second scenario, sensitivity analysis carried out by increasing 10% O&M cost. Sensitivity addresses the impact of increase in O&M cost by 10% over that assumed in the Base

**Scenario III - Combined Adverse Case**

This is a combination of the adverse scenario of decrease in Base traffic by 5% and increase in O&M cost by 10%.

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**Fig. 2**

**Fig. 2**

**SOURCES OF RISKS**

Global risks are defined as being exerted externally to the project environment. Adversely, elemental risks originate from the sources within the project structure which are manageable within the elements of the project [3]. Nucleus element of the BOT project is the concession agreement which has been composed by a number of variables that influence the whole project cycle. Diversity in the variables could result to deviation in the objective and direction of the project. Essentially, it might jeopardize the project’s output and lead to the negative impact to the investment if the promoter fails to address effectively.

Promoter should thoroughly investigate the various sources of risk before making any decision in a BOT project. Based on the literature review, major types and sources of risks have been summarized in Table 2. Appropriate mitigation solutions also have been shown to overcome the identified risks which might occur at different times during the concession period. It has become the responsibility of the promoter to assess and manage the risks with diligence to minimize or prevent any obstacle to the overall progress of the project.
Procedure of study

This research study employed a combination of methods for an integrated qualitative and quantitative research methodology. The first stage was a comprehensive literature review together with lessons learned from the practice of BOT projects in developing countries, especially in India, to develop a initial list of risks associated with India’s BOT infrastructure projects. In the second stage of instrument development, only the critical risks associated with India’s BOT Infrastructure projects were chosen for study.
RISK MANAGEMENT FRAMEWORK FOR BOT INFRASTRUCTURE PROJECT

Based on the survey results and analysis as well as case studies, a risk management framework for investing in India’s future BOT infrastructure projects can be proposed as follows.

Step 1: List all risks associated with the proposed BOT infrastructure project and then analyze these risks in order of importance. The more critical the risk, the more attention should be paid to it.

Step 2: For each risk, list corresponding mitigation measures as more as possible, and then examine the availability of mitigating measures in sequence based on their effectiveness. The more effective the measure, the higher the priority for adoption. Sometimes, a combination of several mitigating measures is needed to be adopted.

Step 3: For each risk and its mitigating measures, negotiate with Indian government and related entities to incorporate the risk mitigation measures, and fine tune the concession agreement and other agreements as much as possible to ensure that all of these risks are adequately covered.

Step 4: Allocate risks to related parties according to the principle that risk should be borne by the party most capable of controlling it. An optimal allocation of risks depends on the relative bargaining power of the parties and the potentiality of reward for taking the risks.

Step 5: Adopt the risk allocation and security structure and enter into financing process for the project.

CONCLUSION

In this research, the critical risks associated with India’s BOT projects were investigated. The main conclusions are as follows:

The traffic projections for the purpose of profitability of project are based on the traffic study of State Highway. The projected financials are robust to service the debt repayment and interest repayment.

On the basis of above analysis and subject to the risks, debt servicing capability of the Project is considered satisfactory and adequate. Based on the various operating, financing and regulatory assumptions, the Project State Highway is expected to achieve the projected profitability.

REFERENCES

[9]. J. Delmon, BOO/BOT projects: A commercial and contractual guide.